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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,676	09/10/2003	Ekkehard Pott	R&P-09561	3737

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EXAMINER

NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/659,676	POTT, EKKEHARD	
	Examiner	Art Unit	
	Tu M. Nguyen	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 28 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-77 is/are pending in the application.
- 4a) Of the above claim(s) 42-77 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 17-34 and 36-41 is/are rejected.
- 7) ☒ Claim(s) 16 and 35 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>091003, 100203</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

1. Applicant's election of the invention of Group I is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 1-41 are readable thereon and will be examined in their full merit. Claims 42-77 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 9-13, 17, 23, 24, 28-32, and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Dölling (U.S. Patent 6,092,367).

Re claim 1, as depicted in Figures 1-6, Dölling discloses a method for operating an internal combustion engine (1), the method which comprises:

- measuring emission values of at least two pollutant components of an exhaust gas of an internal combustion engine, the at least two pollutant components including a first pollutant (ammonia) component and a second pollutant component (pollutant);

- changing a value of at least one operating parameter of the internal combustion engine in order to decrease an emission value of the first pollutant component if the emission value of the first pollutant component exceeds a given maximum threshold value (from Figure 4, if an ammonia slip reaches a maximum threshold value (at the undesirable point A_S), the engine is operated at the new adapted characteristic curve 10' (see Figure 5) which is different from the initial characteristic curve 9' in order to decrease the ammonia slip to the optimized point A_2 , and a quantity of ammonia is adjusted based on the new adapted curve 10') (also see claims 1, 10, and 11); and

- monitoring an emission value of the second pollutant component in order to determine whether the emission value of the second pollutant component remains below a maximum value for the second pollutant component and whether an increase in the emission value to the maximum value for the second pollutant component is permitted (the optimized point A_2 produces an increased of concentration of pollutant; the increased pollutant is, however, within a tolerant window 8 shown in Figure 2).

Re claim 23, as shown in Figures 1-6, Dölling discloses a method for operating an internal combustion engine (1), the method which comprises:

- determining emission values of at least two pollutant components of an exhaust gas of an internal combustion engine, the at least two pollutant components including a first pollutant component (pollutant) and a second pollutant component (ammonia); and

- changing a value of at least one operating parameter of the internal combustion engine if an emission value of the first pollutant component drops below a given minimum threshold value in order to increase the emission value of the first pollutant component to at most the given minimum threshold value in order to decrease at least an emission value of the second pollutant component (from Figure 4, in order to decrease an ammonia slip (by moving from point A_5 to the optimized point A_2), the engine is operated at the new adapted characteristic curve 10' (see Figure 5) which is different from the initial characteristic curve 9', and a quantity of ammonia is adjusted based on the new adapted curve 10'; the optimized point A_2 produces an increased of concentration of pollutant; the increased pollutant is, however, within a tolerant window 8 shown in Figure 2) (also see claims 1, 10, and 11).

Re claim 2, the method of Dölling comprises using, as the internal combustion engine, an engine (1) selected from the group consisting of a diesel internal combustion engine and a spark ignition engine configured for a lean running operation.

Re claim 3, the method of Dölling comprises:

- monitoring, as the first pollutant component, a component selected from the group consisting of CO, NO, NO₂, NH₃, SO₂, H₂S, CH₄ and a hydrocarbon component; and

- monitoring, as the second pollutant component, a further component selected from the group consisting of CO, NO, NO₂, NH₃, SO₂, H₂S, CH₄ and a hydrocarbon component.

Re claim 4, the method of Dölling comprises using, as the at least one operating parameter of the internal combustion engine, at least one parameter selected from the group consisting of a throttle valve position, an exhaust gas recirculation rate, an ignition time, a tumble valve position, an injection time, a charge pressure and a phase position of a camshaft (lines 23-30 of column 5).

Re claims 5 and 24, the method of Dölling comprises measuring, as the emission values, values of a raw emission.

Re claims 9 and 28, the method of Dölling comprises choosing at least one pollutant value (pollutant) as a function of an operating point of the internal combustion engine, wherein the at least one pollutant value is selected from the group consisting of the given maximum threshold value of the first pollutant component, a minimum threshold value of the first pollutant component and the maximum value of the second pollutant component.

Re claims 10 and 29, the method of Dölling comprises:

- choosing at least one pollutant value (pollutant) as a function of an operating point selected from the group consisting of a load of the internal combustion engine, a rotational speed of the internal combustion engine and an operating temperature of the internal combustion engine; and

- using, as the at least one pollutant value (ammonia), a value selected from the group consisting of the given maximum threshold value of the first pollutant component, a minimum threshold value of the first pollutant component and the maximum value of the second pollutant component.

Re claims 11-12 and 30-31, the method of Dölling comprises:

- providing a catalytic converter device (2) in an exhaust gas system of the internal combustion engine (1); and
- choosing at least one threshold value selected from the group consisting of a maximum threshold value of the first pollutant component and a minimum threshold value of the first pollutant component as a function of an operating temperature of the catalytic converter device (lines 31-38 of column 5).

Re claims 13 and 32, the method of Dölling comprises providing a catalytic converter device (1) including a catalytic converter selected from the group consisting of a three-way catalytic converter, an oxidation catalytic converter, and a NO_x storage catalytic converter.

Re claims 17 and 36, the method of Dölling comprises using at least one electrochemical sensor (S5) in order to determine the emission values of the at least two pollutant components.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 6-8, 14-15, 18-20 and 25-27, 33-34, 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dölling as applied to claims 1 and 23, respectively, above, in view of design choice.

Re claims 6-8 and 25 and 27, in the method of Dölling, since the reductant is ammonia, one of the pollutant components is ammonia; and the other pollutant component is obviously NO_x. Thus, Dölling fails to disclose the use of other reductant such as hydrocarbon or carbon monoxide so that one of the detected pollutant components is hydrocarbon or carbon monoxide.

With regard to applicants claim directed to a specified type of reductant, the specification of such would have been an obvious matter of design choice well within the level of ordinary skill in the art depending mostly on the type of engine (i.e., if the engine is diesel type, the reductant is diesel fuel; if the engine is of a spark ignition type, the reductant is ammonia or urea). Moreover, there is nothing in the record which establishes that the specification of such presents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

Re claims 14-15 and 33-34, the method Dölling discloses the invention as cited above, however, fails to disclose that the method comprises providing a plurality of exhaust gas paths in an exhaust gas system of the internal combustion engine; and separately determining emission values assigned to respective ones of the exhaust gas paths.

With regard to applicants claim directed to an exhaust system having a plurality of exhaust gas paths and a plurality of catalytic converters so that the pollutant values are assigned to respective ones of the exhaust gas paths, the specification of such would have been an

obvious matter of design choice well within the level of ordinary skill in the art depending mostly on the type of engine (i.e., if the engine is a V-shaped type, the exhaust system has two exhaust gas paths; if the engine is of a straight 4-cylinder type, the exhaust path has only one exhaust gas path). Moreover, there is nothing in the record which establishes that the specification of such presents a novel of unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

Re claims 18-20 and 37-39, the method Dölling discloses the invention as cited above, however, fails to disclose that the method comprises using at least one optical sensor operating according to a principle of reflection spectroscopy in an infrared light range in order to determine the emission values of the at least two pollutant components.

With regard to applicants claim directed to an optical sensor operating according to a principle of reflection spectroscopy in an infrared light range in order to determine the emission values of the at least two pollutant components, the specification of such would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on design variables, such as the cost of the sensor, availability of the sensor, etc. Moreover, there is nothing in the record which establishes that the specification of such presents a novel of unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

6. Claims 21 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dölling as applied to claims 1 and 23, respectively, above, in view of legal precedent.

The method of Dölling discloses the invention as cited above, however, fails to disclose that the method comprises using at least one sensor having at least one property selected from

the group consisting of a measuring time of less than 500 microseconds and measuring intervals of less than 200 microseconds in order to determine the emission values of the at least two pollutant components.

Dölling discloses the claimed invention except for specifying optimum ranges of measuring time of less than 500 microseconds and measuring intervals of less than 200 microseconds. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide specific optimum ranges of measuring time and measuring intervals, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

7. Claims 22 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dölling as applied to claims 1 and 23, respectively, above, in view of official notice.

The method of Dölling discloses the invention as cited above, however, fails to disclose that the method comprises using at least one sensor to determine both the emission values of the at least two pollutant components and a lambda value of the exhaust gas.

To reduce cost and the complexity of an exhaust system, many exhaust gas sensors today are manufactured with multiple chambers adapted to detect three or more components of the exhaust gas. Thus, it is well known to those with ordinary skill in the art that Dölling utilizes at least one sensor to determine both the emission values of the at least two pollutant components and a lambda value of the exhaust gas. Therefore, such disclosure by Dölling is notoriously well known in the art so as to be proper for official notice.

Allowable Subject Matter

8. Claims 16 and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior Art

9. The IDS (PTO-1449) filed on September 10 and October 2, 2003 have been considered. An initialized copy of each is attached hereto.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of six patents: Zhang et al. (U.S. Patent 6,301,878), Brosda et al. (U.S. Patent 6,355,151), Heinze (U.S. Patent 6,378,295), Xu et al. (U.S. Patent 6,427,439), van Nieuwstadt (U.S. Patent 6,546,720), and Komachiya et al. (U.S. Patent 6,592,732) further disclose a state of the art.

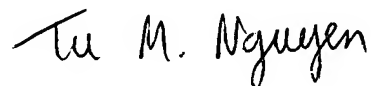
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Communication

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

Tu M. Nguyen

December 12, 2004

Patent Examiner

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